WHAT IS CLAIMED IS:

1. A process for the polyoxyalkylation of a starter comprising:
establishing oxyalkylation conditions in an oxyalkylation reactor in the presence of a double metal cyanide (DMC) catalyst;
continuously introducing into the reactor at least one alkylene oxide and a starter acidified with at least one of an inorganic protic mineral acid and an organic acid, wherein the acid comprises greater than about 100 ppm, based on the weight of the starter; and
recovering an oxyalkylated low molecular weight starter polyether product.

2. The process according to Claim 1, wherein the starter is chosen from glycerine, diglycerol and polyglycerol.

3. The process according to Claim 1, wherein the starter is glycerine.

4. The process according to Claim 1, wherein the starter is chosen from ethylene glycol, propylene glycol, dipropylene glycol, trimethylol-propane, pentaerythritol, sorbitol and sucrose.

5. The process according to Claim 1, wherein the acid is chosen from mineral acids, organic carboxylic acids, phosphonic acids, sulfonic acids and combinations thereof.

6. The process according to Claim 1, wherein the acid is chosen from citric acid, 1,3,5-benzene tricarboxylic acids, phosphonic acids, p-toluenesulfonic acid, hydrochloric acid, hydrobromic acid, sulfuric acid, formic acid, oxalic acid, citric acid, acetic acid, maleic acid, maleic anhydride, succinic acid, succinic anhydride, adipic acid, adipoyl chloride, adipic anhydride, thionyl chloride, phosphorous trichloride, carbonyl

chloride, sulfur trioxide, thionyl chloride phosphorus pentoxide, phosphorous oxytrichloride and combinations thereof.

7. The process according to Claim 1, wherein the acid is phosphoric acid.

8. The process according to Claim 1, wherein the acid comprises greater than about 100 ppm to about 2,000 ppm, based on the weight of the starter.

9. The process according to Claim 1, wherein the acid comprises about 200 ppm to about 300 ppm, based on the weight of the starter.

10. The process according to Claim 1, wherein the reactor is a continuous reactor.

11. The process according to Claim 10, wherein the continuous reactor comprises a tubular reactor.

12. The process according to Claim 10, wherein the step of continuously introducing the at least one alkylene oxide and the low molecular weight starter comprises multi-point addition.

13. The process according to Claim 10, wherein the continuous reactor comprises a back-mixed reactor.

14. The process according to Claim 1, wherein the DMC catalyst is a zinc hexacyanocobaltate.

15. The process according to Claim 1, wherein the alkylene oxide is chosen from ethylene oxide, propylene oxide, oxetane, 1,2- and 2,3-

butylene oxide, isobutylene oxide, epichlorohydrin, cyclohexene oxide, styrene oxide and C_5-C_{30} α-alkylene oxides.

16. The process according to Claim 1, wherein the alkylene oxide is propylene oxide.

17. The process according to Claim 1, wherein the polyether product has a molecular weight of about 260 Daltons (Da) to about 2,500 Da.

18. The process according to Claim 1, wherein the process is continuous.

19. The process according to Claim 1, wherein the process is semibatch.

20. A polyether polyol made by:

establishing oxyalkylation conditions in an oxyalkylation reactor in the presence of a double metal cyanide catalyst;

continuously introducing into the reactor at least one alkylene oxide and a low molecular weight starter acidified with at least one of an inorganic protic mineral acid and an organic acid, wherein the acid comprises greater than about 100 ppm, based on the weight of the low molecular weight starter; and

recovering an oxyalkylated low molecular weight starter polyether product.

21. The polyether polyol according to Claim 20, wherein the low molecular weight starter is chosen from glycerine, diglycerol and polyglycerol.

22. The polyether polyol according to Claim 20, wherein the low molecular weight starter is glycerine.

23. The polyether polyol according to Claim 20, wherein the starter is chosen from ethylene glycol, propylene glycol, dipropylene glycol, trimethylolpropane, pentaerythritol, sorbitol and sucrose.

24. The polyether polyol according to Claim 20, wherein the acid is chosen from mineral acids, organic carboxylic acids, phosphonic acids, sulfonic acids and combinations thereof.

25. The polyether polyol according to Claim 20, wherein the acid is chosen from citric acid, 1,3,5-benzene tricarboxylic acids, phosphonic acids, p-toluenesulfonic acid, hydrochloric acid, hydrobromic acid, sulfuric acid, formic acid, oxalic acid, citric acid, acetic acid, maleic acid, maleic anhydride, succinic acid, succinic anhydride, adipic acid, adipoyl chloride, adipic anhydride, thionyl chloride, phosphorous trichloride, carbonyl chloride, sulfur trioxide, thionyl chloride phosphorus pentoxide, phosphorous oxytrichloride and combinations thereof.

26. The polyether polyol according to Claim 20, wherein the acid is phosphoric acid.

27. The polyether polyol according to Claim 20, wherein the acid comprises greater than about 100 ppm to about 2,000 ppm, based on the weight of the starter.

28. The polyether polyol according to Claim 20, wherein the acid comprises about 200 ppm to about 300 ppm, based on the weight of the starter.

29. The polyether polyol according to Claim 20, wherein the alkylene oxide is chosen from ethylene oxide, propylene oxide, oxetane, 1,2- and

2,3-butylene oxide, isobutylene oxide, epichlorohydrin, cyclohexene oxide, styrene oxide and C_5 - C_{30} α-alkylene oxides.

30. The polyether polyol according to Claim 20, wherein the alkylene oxide is propylene oxide.

31. The polyether polyol according to Claim 20, wherein the DMC catalyst is a zinc hexacyanocobaltate.

32. The polyether polyol according to Claim 20, wherein the polyol has a molecular weight of about 260 Daltons (Da) to about 2,500 Da.

33. In a process of producing a polyurethane by the reaction of at least one isocyanate and at least one isocyanate reactive compound, the improvement comprising producing the isocyanate reactive compound by establishing oxyalkylation conditions in an oxyalkylation reactor in the presence of a double metal cyanide (DMC) catalyst, continuously introducing into the reactor at least one alkylene oxide and a low molecular weight starter acidified with at least one of an inorganic protic mineral acid and an organic acid, wherein the acid comprises in excess of about 100 ppm, based on the weight of the low molecular weight starter and recovering an oxyalkylated low molecular weight starter polyether product.

34. In a process of producing one of a coating, adhesive, sealant, elastomer and foam, the improvement comprising including the polyurethane according to Claim 33.